

REPORT

ON

PEMBERTON VALLEY

RECLAMATION

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August 10, 1945

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BURNETT AND Mc GUGAN

ENGINEERS & SURVEYORS

NEW WESTMINSTER, B.C.

REPORT ON PEMBERTON VALLEY RECLAMATION

August 10, 1945

Hon. George Spence, Esq.,  
Director,  
Prairie Farm Rehabilitation,  
REGINA, Sask.

Dear Sir:

Foreword.

The writer, accompanied by your Gordon MacKenzie, visited the Pemberton Valley, arriving there on November 27th, 1944. At this time A.B. Cook, of the Prairie Farm Rehabilitation was in the Valley in charge of a party making a complete topographical survey of Lillooet River between Lillooet and Tenasse Lakes, as well as of the lower end of Tenasse Lake.

Again we visited Pemberton for a further inspection, arriving there on March 2nd, 1945. At this time J.C. Moore, of the Prairie Farm Rehabilitation was in the Valley in charge of two parties, making complete topographical surveys of that portion of the Pemberton Valley roughly from Green River to Lot 168 at the North end of the district.

We have also had available, all the records and plans of an extensive and complete survey of this valley from Lillooet Lake to a point between Miller and Ryan Creeks, made in 1913 by Cleveland and Cameron of Vancouver.

In addition to Cleveland and Cameron's report, we have reports by B. Russell in 1939, A.B. Cook in 1945, both of the Prairie Farm Rehabilitation, and G.M. Downton of Victoria, B.C.L.S. in 1919, all dealing with the drainage and reclamation of the Valley.

Purpose of Investigation

The purpose of these visits and surveys was to secure information required upon which to base a report of reclamation, outlining the probable degree of reclamation, the methods to be employed, the probable extent and success of these methods, the cost involved in the work and the cost per acre of such expenditures.

General

Lillooet River is a tributary of the Fraser River and heads in the mountains about sixty miles Northwest of Pemberton, a small town on the Pacific Great Eastern Railway. Pemberton is some fifty miles to the Northeast of Squamish on Howe Sound, B.C. Lillooet River flows Southeastwardly through a fertile valley, and passes under the Pacific Great Eastern Railway steel bridge one mile Northeast of Pemberton. At eleven miles Southeast of the bridge it empties into Lillooet Lake, - a deep lake  $15\frac{1}{2}$  miles in length and averaging three quarters of a mile in width. From Lillooet Lake to Tenasse Lake the river is confined to the East side of the valley by a large delta created by Portage Creek, a very steep mountain stream, which flows in from the West. This delta is composed of gravel, both fine and coarse, and boulders weighing up to 1000 lbs. The bed of the river now is rip-rapped with boulders of this size, so that even with the large fall no erosion is taking place. During high water there is a fall of  $15\frac{1}{2}$  feet between these lakes.

All former reports maintain that the widening and lowering of this section of the river between the two lakes is the first step in any program dealing with the reclamation of the valley above Lillooet Lake. Below the delta of Portage Creek the channel widens out into Tenasse Lake, the upper part of which attains a maximum width of 4000 feet and a maximum depth of 150 feet. At a distance of  $1\frac{1}{2}$  miles the channel again narrows to a width of 500 feet for a distance of  $\frac{2}{3}$  miles, and then opens into Lower Tenasse Lake for a distance of approximately two miles. At the outlet of Lower Tenasse Lake there still remain signs of a timber crib dam, built during the old Cariboo Trail days, as this formed part of the old road from New Westminster to the town of Lillooet on the Fraser River. From this point the river continues Southeast at a grade of over twenty feet to the mile through a rocky channel into Harrison Lake. This lake extends 40 miles, still in a Southeasterly direction to Harrison River, and thence to an outlet into the Fraser River at a point about 60 miles East from New Westminster.

The course of the Lillooet River is through heavily timbered mountainous country. In its 30 mile course through the Pemberton Meadows, and the Indian Reserve above Lillooet Lake, the river falls 120 feet. The average high water level of Lillooet Lake is at 655.0 feet elevation, Tenasse Lake at 639.5 feet and Harrison Lake at 34 feet, all elevations referred to Geodetic Datum.

A committee of six residents of the Pemberton Valley, with headquarters at Pemberton, have been very active for some years, in an effort to discover some means by which the rich alluvial soil of the district could be improved to allow 100% development. They have gathered together a great deal of local information, referring to the river, the amount of land at present cultivated and historical data. All of this has been freely made available to us.

At the moment all cultivation is confined to ridges on the banks of the Lillooet River or sloughs from the River. Throughout the years each overflow of the river deposited some extra silt on the banks, the heavy silt falling first and the light last. These deposits made high strips of land along the river which are only flooded occasionally, and which have good drainage at all times of the year. These strips chiefly comprise the cultivated areas of the Valley. They are very fertile, producing potatoes, turnips and other vegetables in very fine quality, and which at all agricultural fairs take many of the prizes. They are also productive, as average yields of 10 to 12 tons of potatoes per acre and 20 tons of turnips per acre amply testify.

#### Gauging Stations

Following is a list and description of gauging stations in the Lillooet River Drainage basin:-

##### 1. Lillooet River near Pemberton

Location:	On the Pacific Great Eastern Railway Bridge $\frac{3}{4}$ of a mile Northeast of Pemberton.
Gauge:	Chain
Drainage Area:	800 square miles
Discharge measurements:	Made from Highway Bridge $\frac{1}{2}$ miles above gauge
Records available:	November 1913 to September 1918 and <i>April 1923 to September 1940</i>

*Extremes of stage recorded:*

Maximum July 19, 1918 - 20,900 sec.ft.  
Minimum Feb. 1, 1922

2. Green River near Pemberton

Location: Above Nairn Falls, 5 miles from mouth  
Gauge: Recording  
Drainage Area: 200 square miles  
Discharge measurements: Made from cable carrier  
Records available: November 1913 to January 1922  
May, 1922 to July 1922 and  
October 1922 to September 1940  
Extremes of stage recorded: Maximum October 28, 1938 - 7.30 p.m.  
(G.H. 14.50) 13,300 sec.ft.  
Minimum February 9, 1937 (ice) 95 sec.ft.

New Extreme Flood Records, October 1940

Mr. C.E. Webb, District Chief Engineer of the Dominion Water and Power Bureau, Vancouver, kindly forwarded the daily and monthly discharge records for the climatic years 1936-37 to 1942-43 for the above two rivers, also the discharge table for the Lillooet River, rating being applicable from high water August 14, 1943 to date. These later records show a new maximum flow of 31,800 sec.ft. in Lillooet River, October 19, 1940 and a new maximum flow of 14,200 sec. ft. in the Green River, October 19, 1940. At this time water covered the whole width of the valley in several places and washed several buildings down the river.

At high water on September 11, 1944, the chain gauge at the P.G.E. Railway bridge over the Lillooet River near Pemberton, registered 9.95 feet and this gauge height rates a discharge of 14,525 sec.ft. Therefore the 20 high water points set on September 11th represent a fairly high water gradient for this river. The above gauge height of 9.95 feet corresponds to an elevation of 684.0 feet (Geodetic and Cook) or 784.0 feet (Cleveland and Cameron). The high water level, Stake #20, of Lillooet Lake on September 11th was found to be 652.6 feet (Geodetic) or 2.4 feet below the average high water level of this lake.

Subdivisions of Report

A consideration of the reclamation of the Pemberton Valley naturally divides the area into four portions, as follows:-

- Area No. 1 - From Lillooet Lake to Green River
- Area No. 2 - From Green River to Miller Creek
- Area No. 3 - From Miller Creek to Ryan Creek
- Area No. 4 - Above Ryan Creek

